PATENT
ATTORNEY DOCKET NO.: 053785-5126

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:	)	
Ku-Hyun PARK et al.	)	Confirmation No. 6405
Application No.: 10/607,044	)	Art Unit: 2871
Filed: June 27, 2003	)	Examiner: M. Caley
For: OPTICALLY COMPENSATED BIREFRINGENCE MODE LIQUID CRYSTAL DISPLAY DEVICE AND METHOD OF FABRICATING THE SAME	)	**Mail Stop Appeal Brief - Patents**

Commissioner for Patents
U.S. Patent and Trademark Office
Mail Stop Appeal Brief - Patents
Alexandria, VA 22314

APPELLANTS' BRIEF UNDER 37 C.F.R. § 41.31

This brief is in furtherance of the Notice of Appeal, filed in the above-identified patent application on September 22, 2005. The fee set forth under 37 C.F.R. § 41.20(b)(2) is being filed concurrently herewith.

1. The Real Party In Interest

The real party in interest in this appeal is LG.Philips LCD Co, Ltd. of Seoul, Korea.

2. Related Appeals and Interferences

Appellants are not aware of any other appeals or interferences that will directly affect, or be directly affected by, or have a bearing on the Board's decision in the appeal.

3. Status of Claims

The status of the claims is as follows:

Claims rejected: 1-20.
Claims objected to: none.
Claims allowed: none.
Claims withdrawn: none.
Claims canceled: none.
Claims appealed: 1-20.

4. Status of Amendments

No Amendments have been filed during prosecution of the present application including subsequent to the Final Office Action dated March 23, 2005. Accordingly, pending/originally-filed claims are attached as Claims Appendix to this brief.

5. Summary of the Claimed Subject Matter

An aspect of Appellants' present invention relates generally to an optically compensated birefringence mode liquid crystal display device and a method of fabricating an optically compensated birefringence mode liquid crystal display device.

Independent Claim 1

With respect to independent claim 1, as discussed in Appellants' specification beginning at paragraph [0034] at page 13 and shown in FIGs. 4A, 4B, and 5, and with respect to FIG. 1, an optically compensated birefringence mode liquid crystal display device includes first substrate 10 and second substrate 30 facing and spaced apart from each other, a liquid crystal material layer 40 between the first substrate 10 and second substrate 30, the liquid crystal material layer 40 having a splay state when a voltage is not applied and having a bend

state when a transition voltage is applied, a first compensation film 12 on an outer surface of the first substrate 10, a first polarizing plate 14 on the first compensation film 12, a second compensation film 32 on an outer surface of the second substrate 30, and a second polarizing plate 34 on the second compensation film 32, wherein the liquid crystal material layer 40 in the splay state has a first retardation value (R1) according to $1.35 < R1/\lambda < 1.75$, the liquid crystal material layer 40 in the bend state has a second retardation value (R2) according to $0.5 < R2/\lambda < 0.7$, when a white voltage for a white image is applied, and a third retardation value (R3) according to $0.1 < R3/\lambda < 0.15$, when a black voltage for a black image is applied.

Independent Claim 11

With regard to independent claim 11, a method of fabricating an optically compensated birefringence mode liquid crystal display device includes forming first substrate 10 and second substrate 30 facing and spaced apart from each other, forming a liquid crystal material layer 40 between the first substrate 10 and second substrate 30, the liquid crystal material layer 40 having a splay state when a voltage is not applied and having a bend state when a transition voltage is applied, forming a first compensation film 12 on an outer surface of the first substrate 10, forming a first polarizing plate 14 on the first compensation film 12, forming a second compensation film 32 on an outer surface of the second substrate 30, and forming a second polarizing plate 34 on the second compensation film 32, wherein the liquid crystal material layer 40 in the splay state has a first retardation value (R1) satisfying according to $1.35 < R1/\lambda < 1.75$, the liquid crystal material layer 40 in the bend state has a second retardation value (R2) according to $0.5 < R2/\lambda < 0.7$, when a white voltage for a white

image is applied, and a third retardation value (R3) according to $0.1 < R3/\lambda < 0.15$, when a black voltage for a black image is applied.

6. Grounds of Rejection To Be Reviewed On Appeal

Claims 1, 2, 5, 11, 12, and 15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakamura (US 6,137,554) in view of Nakamura (US 5,744,197).

Claims 3 and 13 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakamura ('554) in view of Nakamura ('197) and Hattori (US 6,597,424).

Claims 4 and 14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakamura ('554) in view of Nakamura ('197) and Noguchi (US 5,736,066).

Claims 6-10 and 16-20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakamura ('554) in view of Nakamura ('197) and Hashimoto (US 6,657,690).

7. Argument

(i) Rejections under 35 U.S.C. § 112, first paragraph

No claims are presently rejected under 35 U.S.C. § 112, first paragraph.

(ii) Rejections under 35 U.S.C. § 112, second paragraph

No claims are presently rejected under 35 U.S.C. § 112, second paragraph.

(iii) Rejections under 35 U.S.C. § 102

No claims are presently rejected under 35 U.S.C. § 102.

(iv) Rejections under 35 U.S.C. § 103

Claims 1, 2, 5, 11, 12, and 15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakamura (US 6,137,554) in view of Nakamura (US 5,744,197). Appellants respectfully traverse this rejection as being based upon a combination of references that neither teaches nor suggests the novel combination of features recited in independent claims 1, 5, and 10, and hence dependent claims 2-4, 5-9, and 11-13.

Independent claims 1 and 11 both recite an optically compensated birefringence (OCB) mode liquid crystal display (LCD) device including a liquid crystal material layer "having a splay state when a voltage is not applied and having a bending state when a transition voltage is applied" wherein the liquid crystal material layer "in the splay state has a first retardation value (R1) according to: $1.35 < R1/\lambda < 1.75$," as required by independent claims 1 and 11. Specifically, Appellants respectfully assert that, contrary to the Final Office Action's allegations at page 8 under the heading Response to Arguments, Nakamura ('554) is completely silent with regard to teaching "the retardation, R1, of the OCB type liquid crystal layer without a voltage applied (splay state) as from 0.8-2.0 (Column 3 lines 40-43)." For example, at column 3, lines 40-43 of Nakamura ('554), Nakamura ('554) merely discloses that:

> "In addition, the product of index anisotropy Δn of the liquid crystal layer of the liquid crystal display device and the thickness d is preferable to be $0.8<\Delta nd<2.0$."

Accordingly, Appellants respectfully assert that Nakamura ('554) discloses absolutely nothing regarding "retardation R1, of the OCB type liquid crystal layer *without a voltage applied* (splay state) as from 0.8-2.0" (emphasis added), as alleged by the Final Office Action.

Moreover, Appellants respectfully assert that, again contrary to allegations made by the Final Office Action at page 2 under the heading of the rejection, Nakamura ('544) is completely silent with regard to "the liquid crystal material layer having a splay state when a voltage is not applied and having a bend state when a transition voltage is applied (Column 7 lines 16-20)." For example, at column 7, lines 16-20 of Nakamura ('554), Nakamura ('554) merely discloses that:

> "The discotic liquid crystal film of Examples 1 through 3 and Comparative Example 3 has negative Δn equal to that of the bend liquid crystal, thickness of about one half the bend cell, and exactly same orientation as the upper and lower halves of the bend orientation of the liquid crystal at the minimum driving voltage 2.2V."

Accordingly, Appellants respectfully assert that Nakamura ('554) says absolutely nothing regarding "the liquid crystal material layer having *a splay state when a voltage is not applied* and having a bend state when a transition voltage is applied (Column 7 lines 16-20)" (emphasis added), as alleged by the Final Office Action.

In addition, Appellants respectfully assert that Nakamura ('197), in addition to or combined with any of the other applied prior art references, teach or suggest a liquid crystal display device including a liquid crystal material layer in the splay state having "a first retardation value (R1) according to: $1.35<R1/\lambda<1.75$," as recited by independent claims 1 and 11, and hence dependent claims 2-10 and 12-20. Specifically, Appellants respectfully

assert that Nakamura ('197) merely discloses, in FIG. 3 and TABLE 1, bend states of a liquid crystal material, and fails to remedy the admitted deficiencies of Nakamura ('554), as detailed above. Accordingly, Appellants respectfully assert that the combined teachings of Nakamura ('554) and Nakamura ('197) fail to establish a *prima facie* case of obviousness with regard to at least Appellants' independent claims 1 and 11.

Next, Appellants respectfully assert that the Final Office Action contradicts itself upon admission (page 3, lines 4-5) that "Nakamura '554 fails to disclose the retardation within the proposed ranges in the splay state, the bend state, and the black state." Accordingly, the Final Office Action attempts to argue that Nakamura ('197) remedies the deficiencies of Nakamura ('554) by alleging that "Nakamura '197 teaches retardation values within the proposed ranges for each of the states for an analogous type of optically compensated bend mode display for both of the bend states." In addition, the Final Office Action further attempts to argue that "Nakamura '197 teaches a retardation value R2/8 of 0.55 at a minimum applied cell voltage (e.g. 2V, Column 3 lines 14-30 and Column 4 lines 5-7) for maximum transmittance, or the bend white state (Table I embodiment 6, red)." Appellants respectfully assert that Nakamura ('197) fails to teach or suggest anything regarding a liquid crystal material layer "in the splay state has a first retardation value (R1) according to: $1.35 < R1/\lambda < 1.75$," as required by independent claims 1 and 11.

However, the Office Action concludes that "[b]y applying the relationship to Nakamura '554, one of ordinary skill in the art would have arrived at retardation values for each of the states within the proposed ranges as shown above." Appellants respectfully assert that, for at least the reasons set forth above, Nakamura ('554) and Nakamura ('197) both are completely silent with regard to a liquid crystal material layer "in the splay state has a first

retardation value (R1) according to: $1.35 < R1/\lambda < 1.75$," as recited by independent claims 1 and 11. Moreover, Appellants respectfully assert that Nakamura ('554) and Nakamura ('197), whether taken singly or combined, fail to establish a *prima facie* case of obviousness with regard to at least independent claims 1 and 11.

Appellants further respectively assert that the Office Action does not rely upon Noguchi, Hattori, and/or Hashimoto to remedy the deficiencies of Nakamura ('197) and/or Nakamura ('554). Moreover, Appellants respectfully assert that Noguchi, Hattori, and/or Hashimoto cannot remedy the deficiencies of Nakamura ('197) and/or Nakamura ('554), as detailed above.

For the above reasons, Appellants respectfully assert that the rejections under 35 U.S.C. § 103(a) are improper because Nakamura ('197), Nakamura ('554), Noguchi, Hattori, and/or Hashimoto, whether taken individually or in combination, neither teach nor suggest the novel combination of features clearly recited in independent claims 1 and 11, and hence dependent claims 2-10 and 12-20.

(v) Other Rejections

No claims are presently rejected under grounds other than those referred to above.

In view of the foregoing, Appellants respectfully request the reversal of the Examiner's rejection and allowance of the pending claims. If there are any other fees due in connection with the filing of this Appeal Brief, please charge the fees to our Deposit Account No. 50-0310.

If a fee is required for an extension of time under 37 C.F.R. §1.136 not accounted for above, such an extension is requested and the fee should also be charged to our Deposit Account No. 50-0310.

Respectfully submitted,

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By: _____

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8. Claims Appendix

Claim 1 (Original): An optically compensated birefringence mode liquid crystal display device, comprising:

first and second substrates facing and spaced apart from each other;

a liquid crystal material layer between the first and second substrates, the liquid crystal material layer having a splay state when a voltage is not applied and having a bend state when a transition voltage is applied;

a first compensation film on an outer surface of the first substrate;

a first polarizing plate on the first compensation film;

a second compensation film on an outer surface of the second substrate; and

a second polarizing plate on the second compensation film,

wherein the liquid crystal material layer in the splay state has a first retardation value (R1) according to:

$$1.35 < R1/\lambda < 1.75$$

the liquid crystal material layer in the bend state has a second retardation value (R2) according to:

$$0.5 < R2/\lambda < 0.7$$

when a white voltage for a white image is applied, and a third retardation value (R3) according to:

$$0.1 < R3/\lambda < 0.15$$

when a black voltage for a black image is applied.

Claim 2 (Original): The device according to claim 1, further comprising:

a first orientation film between the first substrate and the liquid crystal material layer; and

a second orientation film between the second substrate and the liquid crystal material layer,

wherein the first orientation film has the same alignment direction as the second orientation film.

Claim 3 (Original): The device according to claim 2, wherein the liquid crystal material layer in the bend state has a bend elastic modulus (K_{33}) and a dielectric constant anisotropy ($\Delta\varepsilon$) according to:

$$0.85 < K_{33}/\Delta\varepsilon < 1.5.$$

Claim 4 (Original): The device according to claim 2, wherein the liquid crystal material layer has a phase transition temperature (T_{ni}) from a nematic phase to an isotropic phase according to:

$$90\ ^{\circ}C < T_{ni} < 130\ ^{\circ}C.$$

Claim 5 (Original): The device according to claim 2, wherein the liquid crystal material layer has a ratio (Δn_{LC}(400 nm/550 nm)) of refractive index anisotropy values for wavelengths of 400 nm and 550 nm according to:

$$1.2 < \Delta n_{LC}(400\text{ nm}/550\text{ nm}) < 1.3.$$

Claim 6 (Original): The device according to claim 2, wherein the first compensation film includes a first discotic liquid crystal film on the outer surface of the first substrate and a first biaxial film on the first discotic liquid crystal film, wherein the second compensation film includes a second discotic liquid crystal film on the outer surface of the second substrate and a second biaxial film on the second discotic liquid crystal film.

Claim 7 (Original): The device according to claim 6, wherein each of the first and second discotic films have a ratio ($\Delta n_{discotic}$(400 nm/550 nm)) of refractive index anisotropy values for wavelengths of 400 nm and 550 nm according to:

$$1.2 < \Delta n_{discotic}(400\text{ nm}/550\text{ nm}) < 1.3.$$

Claim 8 (Original): The device according to claim 7, wherein each of the first and second discotic liquid crystal films have a ratio (R_{th}/R_e) of retardation values R_{th} and R_e defined by $R_{th} = \{n_z-(n_x+n_y)/2\}d$ and $R_e = (n_x-n_y)d$ according to:

$$2.8 \leq R_{th}/R_e \leq 3.2.$$

Claim 9 (Original): The device according to claim 8, further comprising a first TAC film on the first polarizing plate and a second TAC film on the second polarizing plate.

Claim 10 (Original): The device according to claim 9, wherein each of the first and second biaxial films and the first and second TAC films have a ratio (R_{th}/R_e) of retardation values R_{th} and R_e defined by $R_{th} = \{n_z-(n_x+n_y)/2\}d$ and $R_e = (n_x-n_y)d$ according to:

$$4.8 \leq R_{th}/R_e \leq 5.2.$$

Claim 11 (Original): A method of fabricating an optically compensated birefringence mode liquid crystal display device, comprising:

forming first and second substrates facing and spaced apart from each other;

forming a liquid crystal material layer between the first and second substrates, the liquid crystal material layer having a splay state when a voltage is not applied and having a bend state when a transition voltage is applied;

forming a first compensation film on an outer surface of the first substrate;

forming a first polarizing plate on the first compensation film;

forming a second compensation film on an outer surface of the second substrate; and

forming a second polarizing plate on the second compensation film,

wherein the liquid crystal material layer in the splay state has a first retardation value (R1) satisfying according to:

$$1.35 < R1/\lambda < 1.75$$

the liquid crystal material layer in the bend state has a second retardation value (R2) according to:

$$0.5 < R2/\lambda < 0.7$$

when a white voltage for a white image is applied, and a third retardation value (R3) according to:

$$0.1 < R3/\lambda < 0.15$$

when a black voltage for a black image is applied.

Claim 12 (Original): The method according to claim 11, further comprising:

forming a first orientation film between the first substrate and the liquid crystal material layer; and

forming a second orientation film between the second substrate and the liquid crystal material layer,

wherein the first orientation film has the same alignment direction as the second orientation film.

Claim 13 (Original): The method according to claim 12, wherein the liquid crystal material layer in the bend state has a bend elastic modulus (K_{33}) and a dielectric constant anisotropy ($\Delta\varepsilon$) according to:

$$0.85 < K_{33}/\Delta\varepsilon < 1.5.$$

Claim 14 (Original): The method according to claim 12, wherein the liquid crystal material layer has a phase transition temperature (T_{ni}) from a nematic phase to an isotropic phase according to:

$$90\ °C < T_{ni} < 130\ °C.$$

Claim 15 (Original): The method according to claim 12, wherein the liquid crystal material layer has a ratio (Δn_{LC}(400 nm/550 nm)) of refractive index anisotropy values for wavelengths of 400 nm and 550 nm according to:

$$1.2 < \Delta n_{LC}(400\ nm/550\ nm) < 1.3.$$

Claim 16 (Original): The method according to claim 12, wherein the first compensation film includes a first discotic liquid crystal film on the outer surface of the first substrate and a first biaxial film on the first discotic liquid crystal film, wherein the second compensation film includes a second discotic liquid crystal film on the outer surface of the second substrate and a second biaxial film on the second discotic liquid crystal film.

Claim 17 (Original): The method according to claim 16, wherein each of the first and second discotic films have a ratio ($\Delta n_{discotic}$(400 nm/550 nm)) of refractive index anisotropy values for wavelengths of 400 nm and 550 nm according to:

$$1.2 < \Delta n_{discotic}(400\ nm/550\ nm) < 1.3.$$

Claim 18 (Original): The method according to claim 17, wherein each of the first and second discotic liquid crystal films have a ratio (R_{th}/R_e) of retardation values R_{th} and R_e defined by $R_{th} = \{n_z-(n_x+n_y)/2\}d$ and $R_e = (n_x-n_y)d$ according to:

$$2.8 \leq R_{th}/R_e \leq 3.2.$$

Claim 19 (Original): The method according to claim 18, further comprising forming a first TAC film on the first polarizing plate and forming a second TAC film on the second polarizing plate.

Claim 20 (Original): The method according to claim 19, wherein each of the first and second biaxial films and the first and second TAC films have a ratio (R_{th}/R_e) of retardation values R_{th} and R_e defined by $R_{th} = \{n_z-(n_x+n_y)/2\}d$ and $R_e = (n_x-n_y)d$ according to:

$$4.8 \leq R_{th}/R_e \leq 5.2.$$

9. Evidence Appendix

No information is appended under this section.

10. Related Proceedings Appendix

No information is appended under this section.

AF / NEW

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APPELLANTS' BRIEF TRANSMITTAL FORM

1. Transmitted herewith is the Appellants' Brief Under 37 C.F.R. § 41.31, which is being submitted further to the Notice of Appeal filed September 22, 2005.

2. Additional papers enclosed.

- ☐ Drawings: [ ] Formal [ ] Informal (Corrections)
- ☐ Information Disclosure Statement
- ☐ Form PTO-1449, ___ references included
- ☐ Citations
- ☐ Declaration of Biological Deposit
- ☐ Submission of "Sequence Listing", computer readable copy and/or amendment pertaining thereto for biotechnology invention containing nucleotide and/or amino acid sequence.

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3. Oral Hearing Under 37 C.F.R. 1.194

☐ Oral hearing is hereby requested.
☐ Fee under 37 C.F.R. 1.17(d) is enclosed.

4. Extension of time

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

☒ Appellants petition for an extension of time, the fees for which are set out in 37 CFR 1.17(a)-(d), for the total number of months checked below:

Total months requested	Fee for extension	[fee for Small Entity]
☒ one month	$ 120.00	$ 60.00
☐ two months	$ 450.00	$ 225.00
☐ three months	$ 1,020.00	$ 510.00
☐ four months	$1,590.00	$ 795.00
☐ five months	$2,160.00	$1,080.00

Extension of time fee due with this request: **$120.00**

If an additional extension of time is required, please consider this a Petition therefor.

5. Fee Payment

☐ No fee is to be paid at this time.

☒ The Commissioner is hereby authorized to charge **$620.00** ($120.00 for the 1-month extension of time fee and $500.00 for the Appellants' Brief filing fee due to Deposit Account No. 50-0310.

☒ The Commissioner is hereby authorized to charge any fees including fees due under 37 CFR 1.16 and 1.17 which may be required, or credit any overpayment to Deposit Account No. 50-0310.

Respectfully submitted,

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Date: December 20, 2005

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